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09/779,092	02/08/2001	William C. Hardy	RIC-00-031	1671

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EXAMINER	
TAYLOR, BARRY W	
ART UNIT	**PAPER NUMBER**
2643	25

DATE MAILED: 06/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	09/779,092	HARDY, WILLIAM C.	
	Examiner	Art Unit	
	Barry W Taylor	2643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 March 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-61* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,11-19,23-30,34-38,42,49,50 and 54-61* is/are rejected.

7)☒ Claim(s) *4-9,20-22,31-33,39-41 and 51-53* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *24*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 10-18, 23-30, 34-37, 49 and 54-61 are rejected under 35 U.S.C. 102(b) as being anticipated by Meyers et al (5,715,372 hereinafter Meyers).

Regarding claims 1, 14, 18, 23, 29, 37, 49, 54 and 61. Meyers teaches a system and method of evaluating quality (abstract) comprising:

measuring circuit operative to measure at least one characteristic of telephonic voice connection (see 20 figure 1 wherein measuring circuit used to derive a feature set from an input signal enabling for objective measurements of voice quality to be correlated to actual MOS (i.e. mean opinion score), col. 1 lines 5-10, line 62, col. 2 lines 18-48, col. 3 lines 1-4, lines 25-60, col. 5 lines 20-25); and

calculating a solution to at least one empirically derived mathematical function by using at least one measured characteristic (see col. 4 lines 45-65, col. 3 lines 40-51, col. 5 lines 26-53 wherein Meyers shows at least eight measured characteristic data may be used to calculate solution (i.e. feature set) that is used to derive SNR to be applied to the intelligent system 30 shown in figure 1 resulting in faster processing by

the system and more direct convergence to the proper weights necessary for the system to accurately characterize the input signal) as an independent variable in the at least one empirically derived mathematical function, whereby the solution is an estimate of likely user perception of the quality of the telephonic voice connection.

Regarding claims 10, 26, and 34. Meyers teaches at least one characteristic is noise (see SNR column 5).

Regarding claims 11-13, 15-17, 24-25, 27-28, 30, 35-36, and 55-60. Meyers teaches a the present invention can be applied to communication systems evaluation, voice coder/decoder evaluation, coding algorithm evaluation, and the like (col. 7 lines 41-60) as well as other communication systems (see multi-media col. 7 lines 61-67).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 2-3, 19, 38, 42 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meyers et al (5,715,372 hereinafter Meyers) in view of Malvar (6,256,608).

Regarding claims 2-3, 19, 38, 42, and 50. Meyers does not show using probability distribution function. However, Meyer discloses correlating input signal to a

MOS score having scale of 1-5 to obtain an objective measure (col. 7 lines 1-12, col. 7 line 49 – col. 8 line 4).

Malvar teaches a system and method for real time parametric modeling for a probability distribution function that approximates the users perception of the quality of a voice connection (abstract, columns 1-4, col. 5 lines 30-67, columns 7-12, col. 13 line 43 – col. 16 line 66, col. 18 line 50+). Malvar discloses using a modified probability distribution model wherein the shape is controlled by a single parameter, which is directly related to the peak value of the coefficients (columns 19-22) thus minimizing computational overhead for model selections. Furthermore, Malvar defines a "BARK SCALE" see column 13 lines 43+. Column 15 reveals scalar quantization wherein the final weighting function determines the spectral shape of the quantization noise that would be minimally perceived, as per the model discussed above. Column 16 even reveals a unique representation having probabilities. Column 18 and figure 16 reveals probability modeling. More importantly, columns 19-20 reveals that parametric modeling uses a model for a probability distribution function (PDF) of the quantized and run-length encoded transform coefficients. Please see column 19 lines 17+ wherein "Usually, codecs that use entropy coding (typically Huffman codes) derive PDFs (and their corresponding quantization tables) from histograms obtained from a collection of audio samples. In contrast, the present invention utilizes a modified Laplacian+exponential probability density fitted to every incoming block, which allows for better encoding performance.

One advantage of the PDF model of the present invention is that its shape is controlled by a single parameter, which is directly related to the peak value of the quantized coefficients. That leads to no computational overhead for model selection, and virtually no overhead to specify the model to the decoder". Please see column 19 lines 17+ wherein "Specifically, the probability distribution model of the present invention preferably utilizes a modified Laplacian+exponential probability density function (PDF) to fit the histogram of quantized transform coefficients for every incoming block. The PDF model is controlled by the parameter A described in box 1510 of FIG. 15 above (it is noted that A is approximated by vr, as shown by box 1512 of FIG. 15). Thus, the PDF model is defined by: ##EQU10##".

It would have been obvious for any one of ordinary skill in the art at the time of invention to modify the invention as taught by Meyers to use the probability distribution function (PDF) as taught by Malvar to further qualify the input signal as taught by Meyers before providing the feature set to the intelligent system (see feature set provided to intelligent system 30 figure 1 of Meyers) further reducing computational overhead for model selections as taught by Malvar (col. 19 lines 14-40).

Allowable Subject Matter

3. Claims 4-9, 20-22, 31-33, 39-41, 43-48 and 51-53 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

4. Applicant's arguments filed 3/26/04 have been fully considered but they are not persuasive.

a) Regarding Applicant's remark on page 4, second full paragraph, wherein Applicant's contend that those skilled in the art would not consider taking the Fourier Transform of a time domain input signal to obtain frequency domain representation of the signal, or taking the log of the ratio of two power values, as being empirically derived mathematical functions. Thus, neither the PSD calculation nor the SNR calculation represents "a solution to at least one empirically derived mathematical function by using at least one measured characteristic as an independent variable in the at least one empirically derived mathematical function, whereby the solution is an estimate of likely user perception of the quality of telephonic voice connection, as recited in claim 1.

The Examiner respectfully disagrees. First of all, Applicant's independent claims 1, 18, 29, 37, 49 and 61 generally recite "at least one empirically derived mathematical function" which is vague and could mean anything, including Meyers column 5 lines 20-46 wherein Meyers anticipates the "at least one" by using at least 18 SNR (i.e. measured values) to be used as independent input. In other words, Meyers uses measuring circuit (see 20 figure 1) to derive a feature set from an input signal enabling

for objective measurements of voice quality to be correlated to actual MOS (i.e. mean opinion score). Meyers uses at least eight measured characteristic data (col. 4 lines 45-65, col. 3 lines 40-51 and col. 5 lines 20-46) may be used to calculate a solution (i.e. feature set) that is used to derive SNR to be applied to the intelligent system 30 shown in figure 1, which results in faster processing by the system and more direct convergence to the proper weights necessary for the system to accurately characterize the input signal. Meyer's use of SNR is irrelevant to Applicant's vague independent claim language wherein "any" empirically derived mathematical function can be used. Furthermore, Applicant's do not define what is meant by the "empirically derived" function until dependent claims 4-9, 20-22, 31-33, 43-48 and 51-53 which the Examiner has objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent from including all of the limitations of the base claim and any intervening claims.

b) Regarding Applicant's remarks at the bottom of page 4 wherein Applicant's argue method claim 18 and computer claim 49 are not taught by Meyers.

The Examiner disagrees. Meyers anticipates device claim 1 which is linked to method claim 18 and computer claim 49. Therefore, method claim 18 and computer claim 49 are rejected for at least the same reason as apparatus claim 1 since the claimed apparatus would perform the steps of the recited method claim 18 and program claim 49.

c) Next, Applicant's contend that dependent claims 23-28 should be allowable in their own right (see middle paragraph page 5).

The Examiner disagrees. First of all, claims 23-28 depend on rejected base claims (see Examiner's rejection listed above). Meyer indeed uses characteristic critical to the listener (columns 5 and 7) which reads on at least C-message noise.

d) Applicant's again argue that Meyers fails to teach programmable device and memory operative to store at least one empirically derived mathematical function (last paragraph page 5).

Examiner notes that Meyers teaches that after training the inherent feature of neural network device is to use input to produce output to characterize the inputted signal. One of minimum skill in the art would readily recognize that "intelligent" networks have some sort of smarts (i.e. programmable controller containing mathematical functions to characterize input signal).

e) Applicant's start repeating arguments for dependent claims (see middle paragraph page 6) wherein Applicant's again argue that dependent claims 30 and 34-36 should be allowable in their own right.

The Examiner disagrees. First of all, claims 30 and 34-36 depend on rejected base claims (see Examiner's rejection listed above). Meyer indeed uses characteristic critical to the listener (columns 5 and 7) which reads on at least C-message noise.

f) Applicant's repeat arguments for method claim 37 (see second to last paragraph on page 6).

The Examiner disagrees. Meyers anticipates device claim 1 which is linked to method claim 37. Therefore, method claim 37 is rejected for at least the same reason as apparatus claim 1 since the claimed apparatus would perform the steps of the recited method claim 37.

g) Applicant's contend that Meyer's fails to teach a two dimensional curve having shape (see top of page 7).

Meyer's not only uses table containing multi-dimensions (see col. 4 lines 45-66) but indeed uses "tuning curves" (col. 4 line 41). Furthermore, Meyer's is not limited to using two-dimensional array (see col. 3 wherein other metrics may be used by the intelligent system to characterize input signal).

h) Applicant's content that Meyer's fails to convert function into computer executable instructions (see second paragraph page 7).

Examiner notes that Meyers teaches that after training the inherent feature of neural network device is to use input to produce output to characterize the inputted signal. One of minimum skill in the art would readily recognize that "intelligent" networks have some sort of smarts (i.e. programmable controller containing mathematical functions to characterize input signal).

i) Applicant's repeat argument for program claim 61 (see bottom of page 7).

The Examiner disagrees. Meyers anticipates device claim 1 which is linked to program claim 61. Therefore, program claim is rejected for at least the same reason as apparatus claim 1 since the claimed apparatus would perform the programmed steps recited in claim 61.

j) Applicant's next turn to Examiner's 103 rejection (see middle of page 9) wherein Applicant's contend that Meyers in view of Malvar fail to disclose the use of "empirically derived functions".

The Examiner respectfully disagrees. First of all, Applicant's independent claims 1, 18, 29, 37, 49 and 61 generally recite "at least one empirically derived mathematical function" which is vague and could mean anything, including Meyers column 5 lines 20-46 wherein Meyers anticipates the "at least one" by using at least 18 SNR (i.e. measured values) to be used as independent input. In other words, Meyers uses measuring circuit (see 20 figure 1) to derive a feature set from an input signal enabling for objective measurements of voice quality to be correlated to actual MOS (i.e. mean opinion score). Meyers uses at least eight measured characteristic data (col. 4 lines 45-65, col. 3 lines 40-51 and col. 5 lines 20-46) may be used to calculate a solution (i.e. feature set) that is used to derive SNR to be applied to the intelligent system 30 shown in figure 1, which results in faster processing by the system and more direct convergence to the proper weights necessary for the system to accurately characterize the input signal. Meyer's use of SNR is irrelevant to Applicant's vague independent claim language wherein "any" empirically derived mathematical function can be used. Furthermore, Applicant's do not define what is meant by the "empirically derived" function until dependent claims 4-9, 20-22, 31-33, 43-48 and 51-53 which the Examiner has objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent from including all of the limitations of the base claim and any intervening claims.

However, Meyers does not show using probability distribution function. However, Meyer discloses correlating input signal to a MOS score having scale of 1-5 to obtain an objective measure (col. 7 lines 1-12, col. 7 line 49 – col. 8 line 4).

Malvar teaches a system and method for real time parametric modeling for a probability distribution function that approximates the users perception of the quality of a voice connection (abstract, columns 1-4, col. 5 lines 30-67, columns 7-12, col. 13 line 43 – col. 16 line 66, col. 18 line 50+). Malvar discloses using a modified probability distribution model wherein the shape is controlled by a single parameter, which is directly related to the peak value of the coefficients (columns 19-22) thus minimizing computational overhead for model selections. Furthermore, Malvar defines a "BARK SCALE" see column 13 lines 43+. Column 15 reveals scalar quantization wherein the final weighting function determines the spectral shape of the quantization noise that would be minimally perceived, as per the model discussed above. Column 16 even reveals a unique representation having probabilities. Column 18 and figure 16 reveals probability modeling. More importantly, columns 19-20 reveals that parametric modeling uses a model for a probability distribution function (PDF) of the quantized and run-length encoded transform coefficients. Please see column 19 lines 17+ wherein "Usually, codecs that use entropy coding (typically Huffman codes) derive PDFs (and their corresponding quantization tables) from histograms obtained from a collection of audio samples. In contrast, the present invention utilizes a modified Laplacian+exponential probability density fitted to every

incoming block, which allows for better encoding performance. One advantage of the PDF model of the present invention is that its shape is controlled by a single parameter, which is directly related to the peak value of the quantized coefficients. That leads to no computational overhead for model selection, and virtually no overhead to specify the model to the decoder".

Please see column 19 lines 17+ wherein "Specifically, the probability distribution model of the present invention preferably utilizes a modified Laplacian+exponential probability density function (PDF) to fit the histogram of quantized transform coefficients for every incoming block. The PDF model is controlled by the parameter A described in box 1510 of FIG. 15 above (it is noted that A is approximated by vr, as shown by box 1512 of FIG. 15). Thus, the PDF model is defined by: ##EQU10##".

It would have been obvious for any one of ordinary skill in the art at the time of invention to modify the invention as taught by Meyers to use the probability distribution function (PDF) as taught by Malvar to further qualify the input signal as taught by Meyers before providing the feature set to the intelligent system (see feature set provided to intelligent system 30 figure 1 of Meyers) further reducing computational overhead for model selections as taught by Malvar (col. 19 lines 14-40).

k) Applicant's next argue that there is no suggestion or motivation to combine.

The Examiner notes that, Meyers does not show using probability distribution function. However, Meyer discloses correlating input signal to a MOS score having scale of 1-5 to obtain an objective measure (col. 7 lines 1-12, col. 7 line 49 – col. 8 line 4). More importantly, both Meyers and Malvar inventions directed towards voice coding algorithms (Meyers col. 7 lines 49-67 and Malvar col. 5 lines 31-34, lines 47-49, col. 13 lines 43-51, col. 14 lines 17-18, col. 15 lines 32-33, col. 19 lines 14-41). The motivation is self-evident.

If not Malvar provides motivation (Please see column 19 lines 17+ wherein "Usually, codecs that use entropy coding (typically Huffman codes) derive PDFs (and their corresponding quantization tables) from histograms obtained from a collection of audio samples. In contrast, the present invention utilizes a modified Laplacian+exponential probability density fitted to every incoming block, which allows for better encoding performance. One advantage of the PDF model of the present invention is that its shape is controlled by a single parameter, which is directly related to the peak value of the quantized coefficients. That leads to no computational overhead for model selection, and virtually no overhead to specify the model to the decoder". Please see column 19 lines 17+ wherein "Specifically, the probability distribution model of the present invention preferably utilizes a modified Laplacian+exponential probability density function

(PDF) to fit the histogram of quantized transform coefficients for every incoming block. The PDF model is controlled by the parameter A described in box 1510 of FIG. 15 above (it is noted that A is approximated by vr, as shown by box 1512 of FIG. 15). Thus, the PDF model is defined by: ##EQU10##".).

Conclusion

5. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barry W Taylor whose telephone number is (703) 305-4811. The examiner can normally be reached on Monday-Friday from 6:30am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz can be reached on (703) 305-4708. The fax phone number for this Group is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to Technology Center 2600 customer service Office whose telephone number is (703) 306-0377.

CURTIS KUNTZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600